

ABSTRACT

A fiber optical attenuator utilizing the cut-off phenomenon for single mode propagation of an optical wave down a single mode fiber, comprising an element such as a pixelated liquid crystal element, capable of spatially changing the phase across the cross section of an input optical signal. Such a spatial phase change is equivalent to a change in the mode structure of the propagating wave. The signal propagating in the single mode output fiber is attenuated in accordance with the extent to which higher order modes are mixed into the low order mode originally present. When the mode is completely transformed to higher order modes, the wave is effectively completely blocked from entering the output single-mode fiber, and the attenuation is high. The level of attenuation is determined by the fraction of the wave which is converted to modes other than the lowest order mode, and is thus controllable by the voltage applied to the pixels of the liquid crystal element.